

# Direct, Indirect and Cumulative Impacts

2003 Community Impact  
Assessment

Midwest Regional Workshop

# Definitions

## Direct Impacts

- “...effects which are caused by the action and occur at the same time and place.”

40 CFR 1508.8(a)



# Definitions

# Direct Impacts





# Definitions

## Indirect Impacts

- “...effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate...”

# Definitions

## InDirect Impacts





# Definitions

## Cumulative Impacts

- “The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.”

40 CFR 1508.7

# Definitions

# Cumulative Impacts





# Process Sources

- ◆ *“Considering Cumulative Effects Under the National Environmental Policy Act”*  
Council on Environmental Quality,  
January 1997

# Process

1. Identify the significant cumulative effects issues associated with I-69



**WETLAND**

# Process

1. Identify the significant cumulative effects issues associated with I-69



**FOREST**

# Process

1. Identify the significant cumulative effects issues associated with I-69



**FARMLAND**

# Process

2. Establish the geographic scope for the analysis



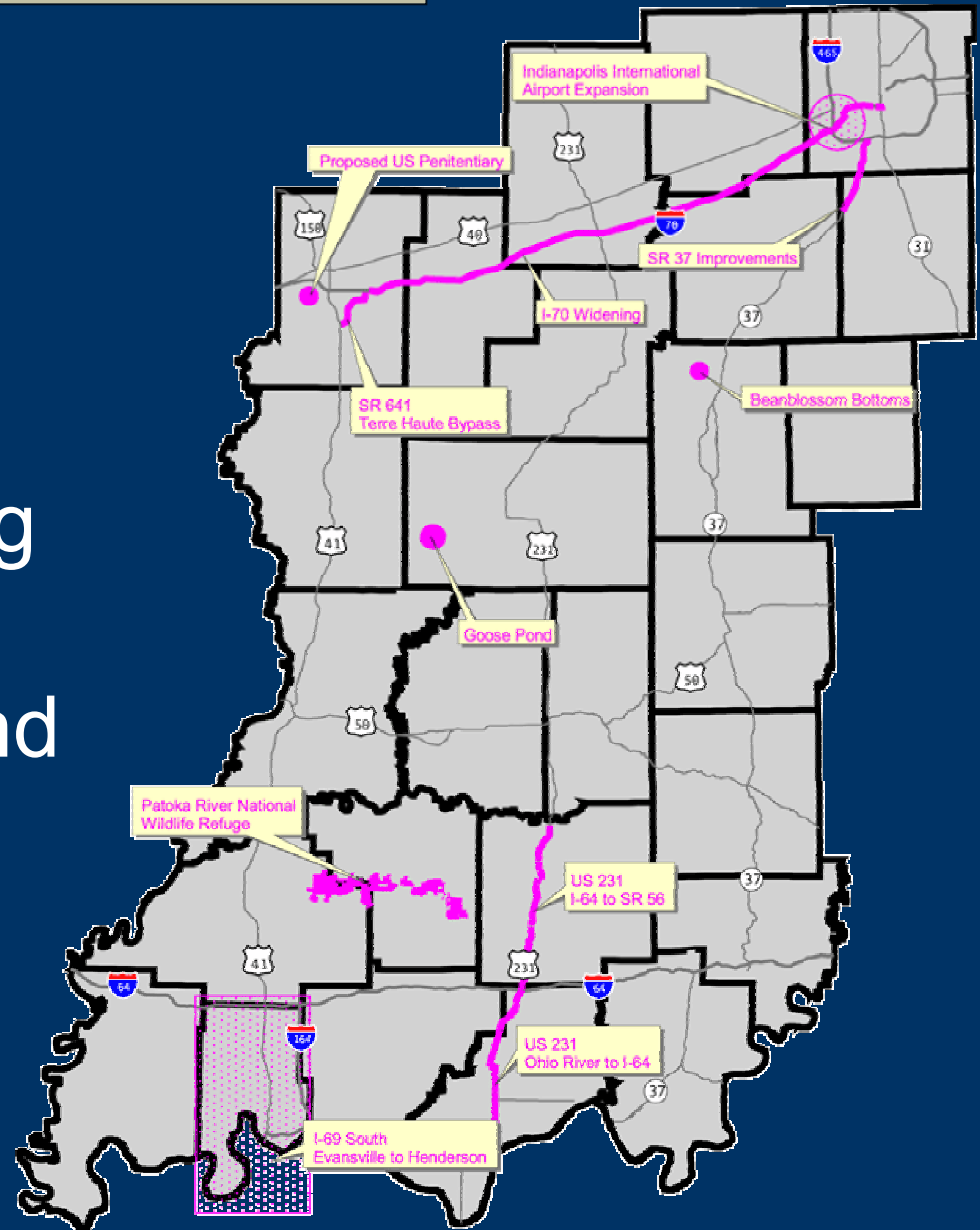
# Process

3. Establish a time frame for the analysis



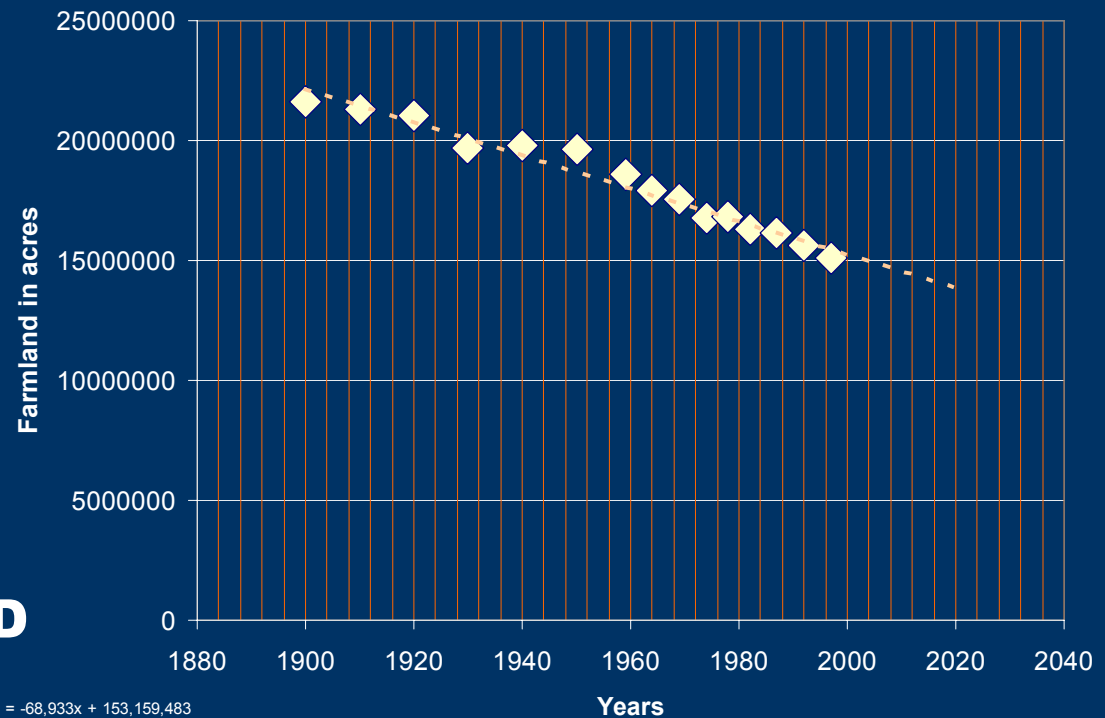
# Process

4. Identify other actions affecting the resources ecosystems, and human communities of concern



# Process

5. Characterize the resources, ecosystems, and human communities identified in scoping and explain how they have historically changed

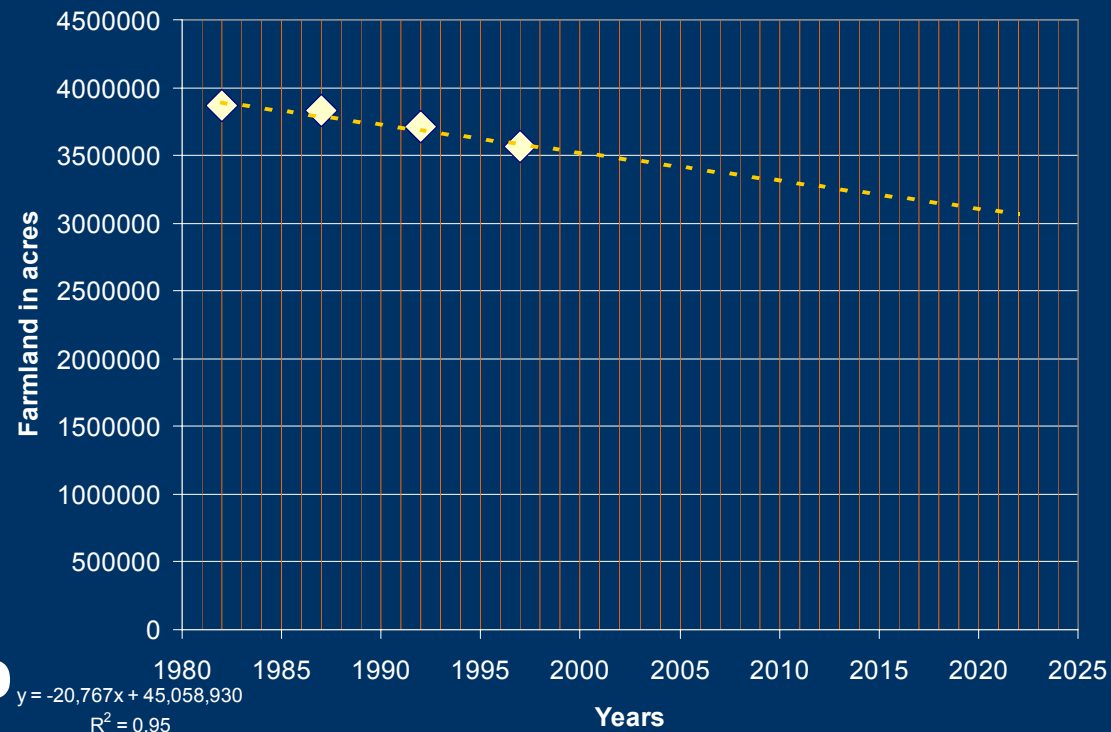


**INDIANA FARMLAND**

# Process

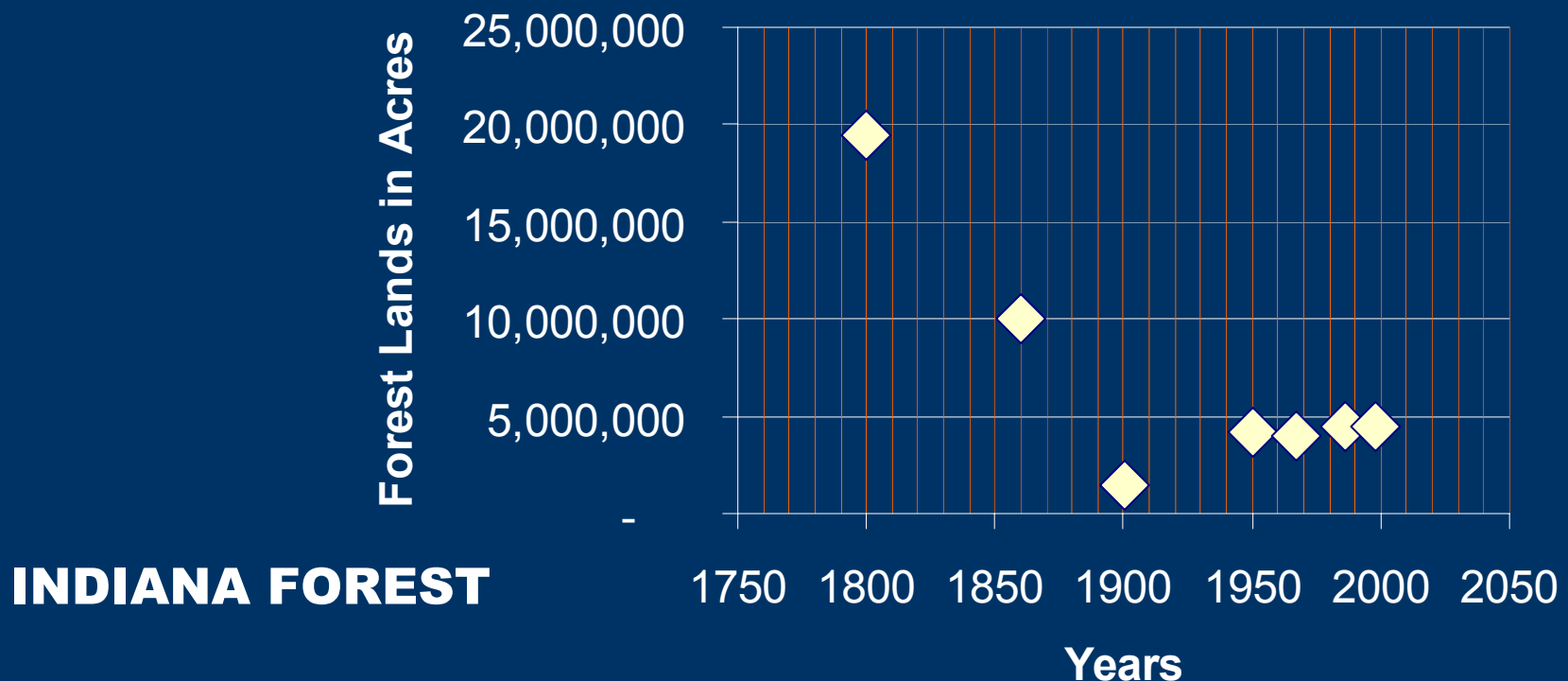
5. Characterize the resources, ecosystems, and human communities identified in scoping and explain how they have historically changed

## **SOUTHWESTERN INDIANA FARMLAND**



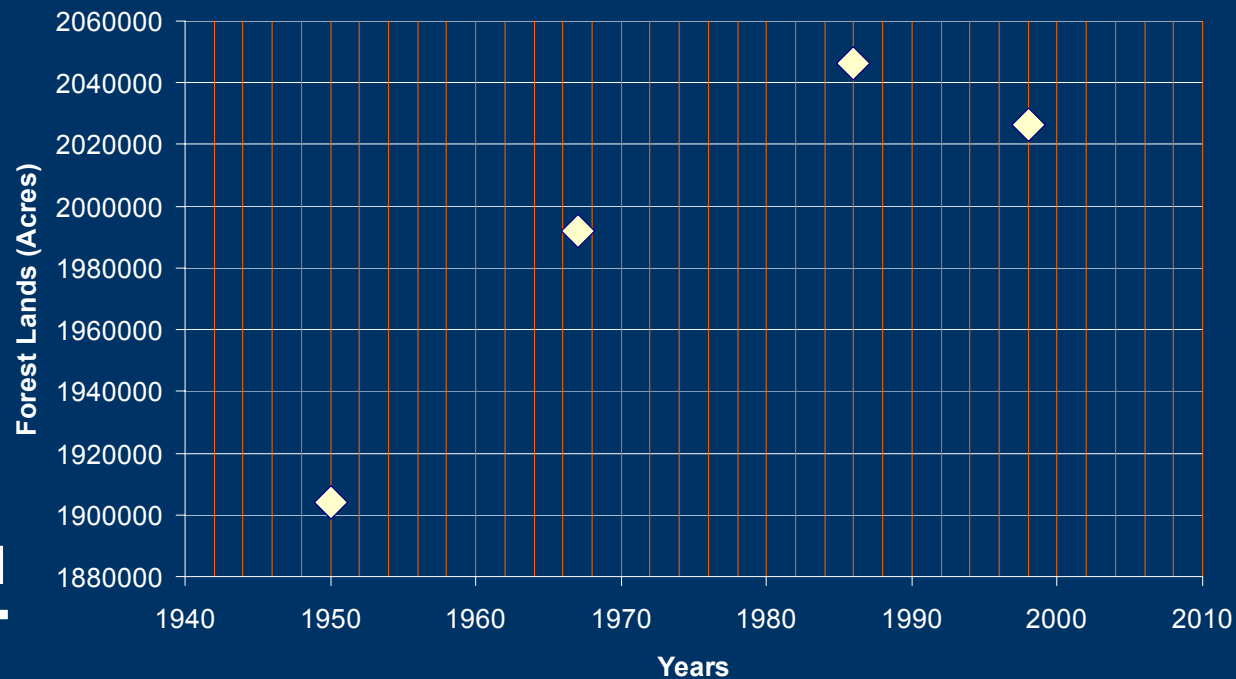
# Process

5. Characterize the resources, ecosystems, and human communities identified in scoping and explain how they have historically changed



# Process

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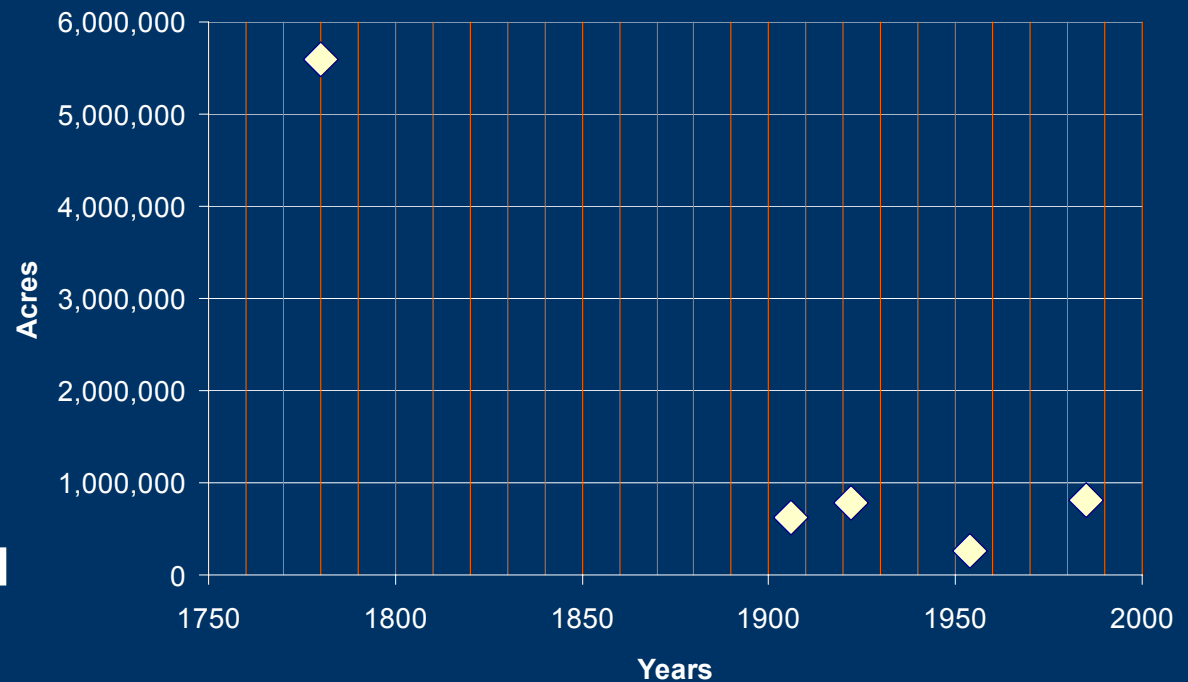


**SOUTHWESTERN  
INDIANA FOREST**

# Process

5. Characterize the resources, ecosystems, and human communities identified in scoping and explain how they have historically changed

## WETLANDS IN INDIANA





# Process

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds

**FARMLAND**

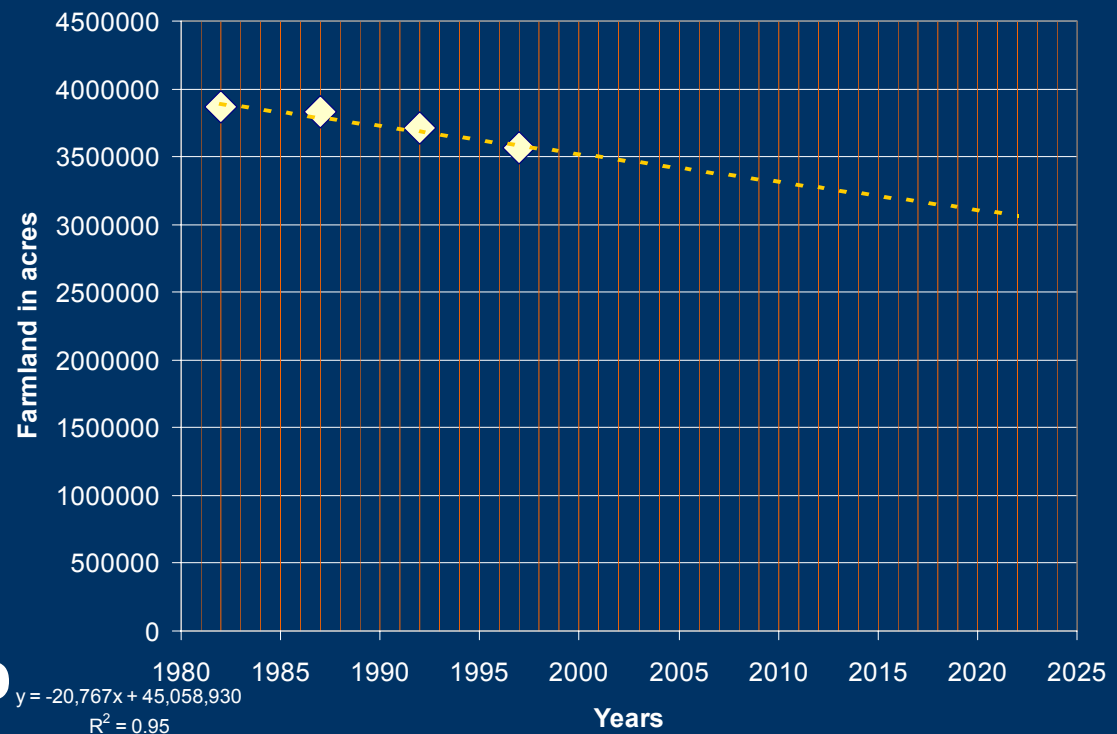
**FOREST**

**WETLAND**

# Process

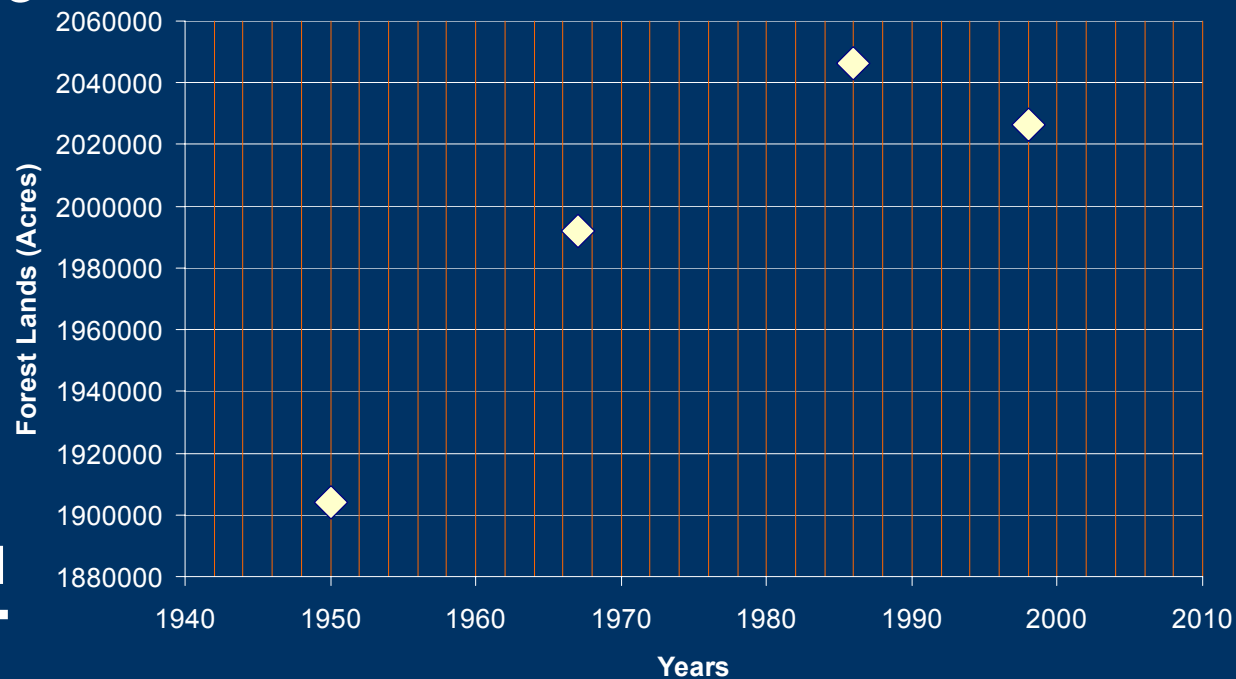
7. Define a baseline condition for the resources, ecosystems, and human communities without I-69

## SOUTHWESTERN INDIANA FARMLAND



# Process

7. Define a baseline condition for the resources, ecosystems, and human communities without I-69

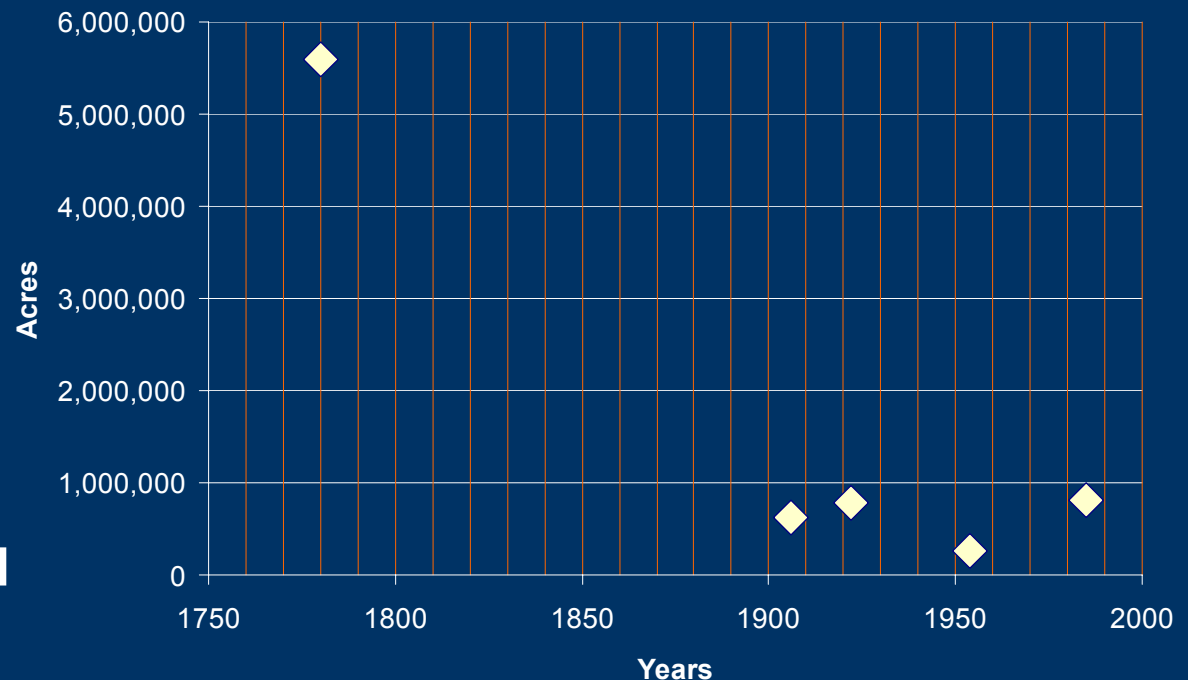


**SOUTHWESTERN  
INDIANA FOREST**

# Process

7. Define a baseline condition for the resources, ecosystems, and human communities without I-69

## WETLANDS IN INDIANA



# Process

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human community





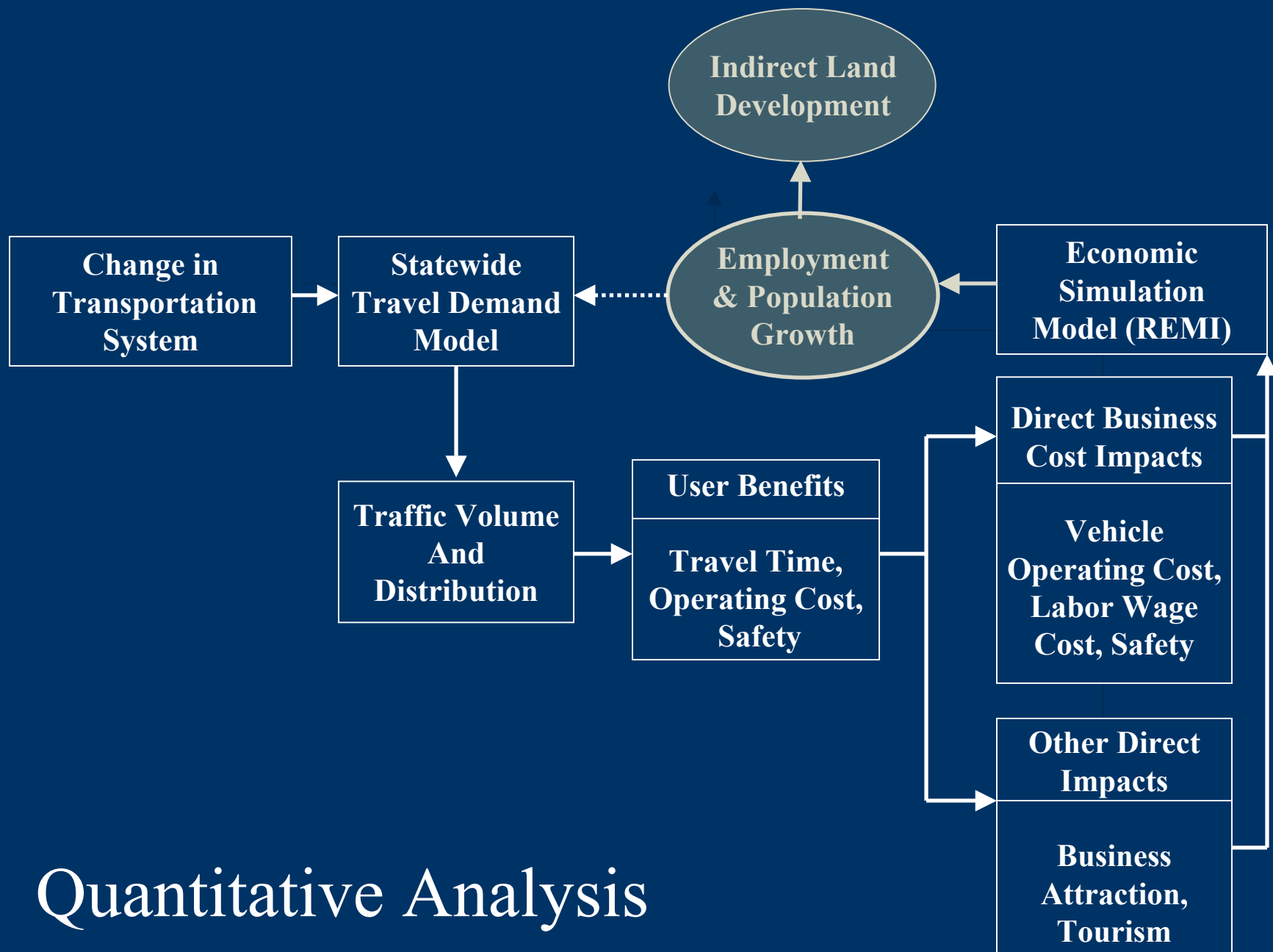
# Process

9. Determine the magnitude and significance of cumulative effects by identifying the changes as a result of I-69



# Qualitative Analysis

- ◆ Coordinate with local groups:
  - Plan Commissions
  - Elected Officials
  - Property Owners
  - Resource Agencies
- ◆ Use local resources and documents:
  - Future land use plans
  - Zoning and Subdivision Ordinances



# Quantitative Analysis

# Acreage Conversions

## Residential

- Household sizes – weighted averages of constituent counties from Woods & Poole
- % Single-Family DUs – weighted averages of constituent counties from US Census
- 3 single-family units-per-acre (*Trip Generation – 6<sup>th</sup> Edition* ITE) and 7 multi-family units-per-acre (*Community Builders Handbook*, Urban Land Institute)

REGION	Year 2025 Household Size	Percent Single-Family Dwellings	Dwelling Units per Acre
Indianapolis	2.42	65.6	4.38
Bloomington	2.27	54.6	4.82
Terre Haute	2.36	74.0	4.04
Evansville	2.40	72.5	4.10
Rural SW Indiana	2.48	76.1	3.96

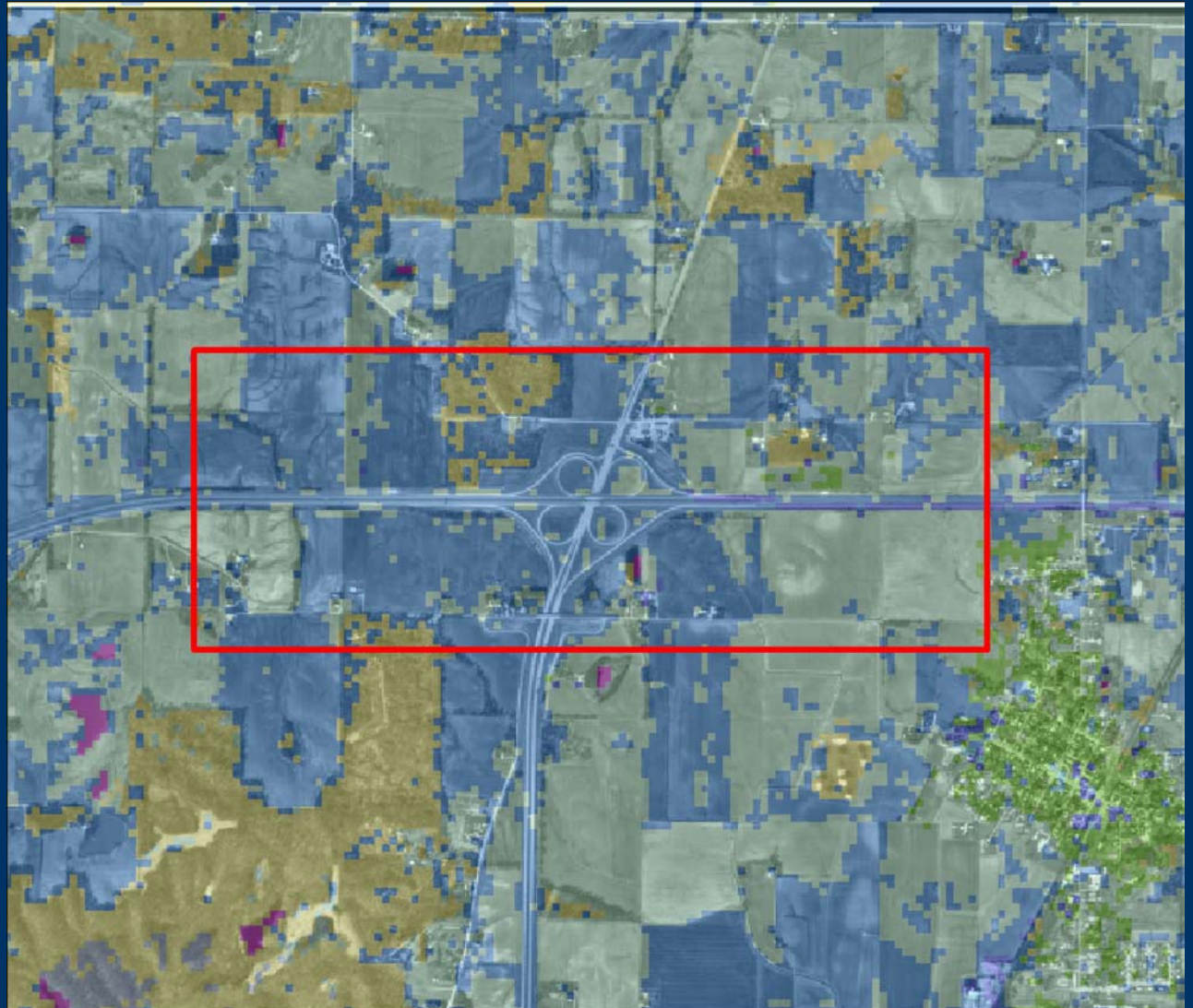
# Acreage Conversions

## Industrial / Commercial

- *Trip Generation – 6<sup>th</sup> Edition, ITE*
- *Planning Design Criteria, Chiara and Koppelman*

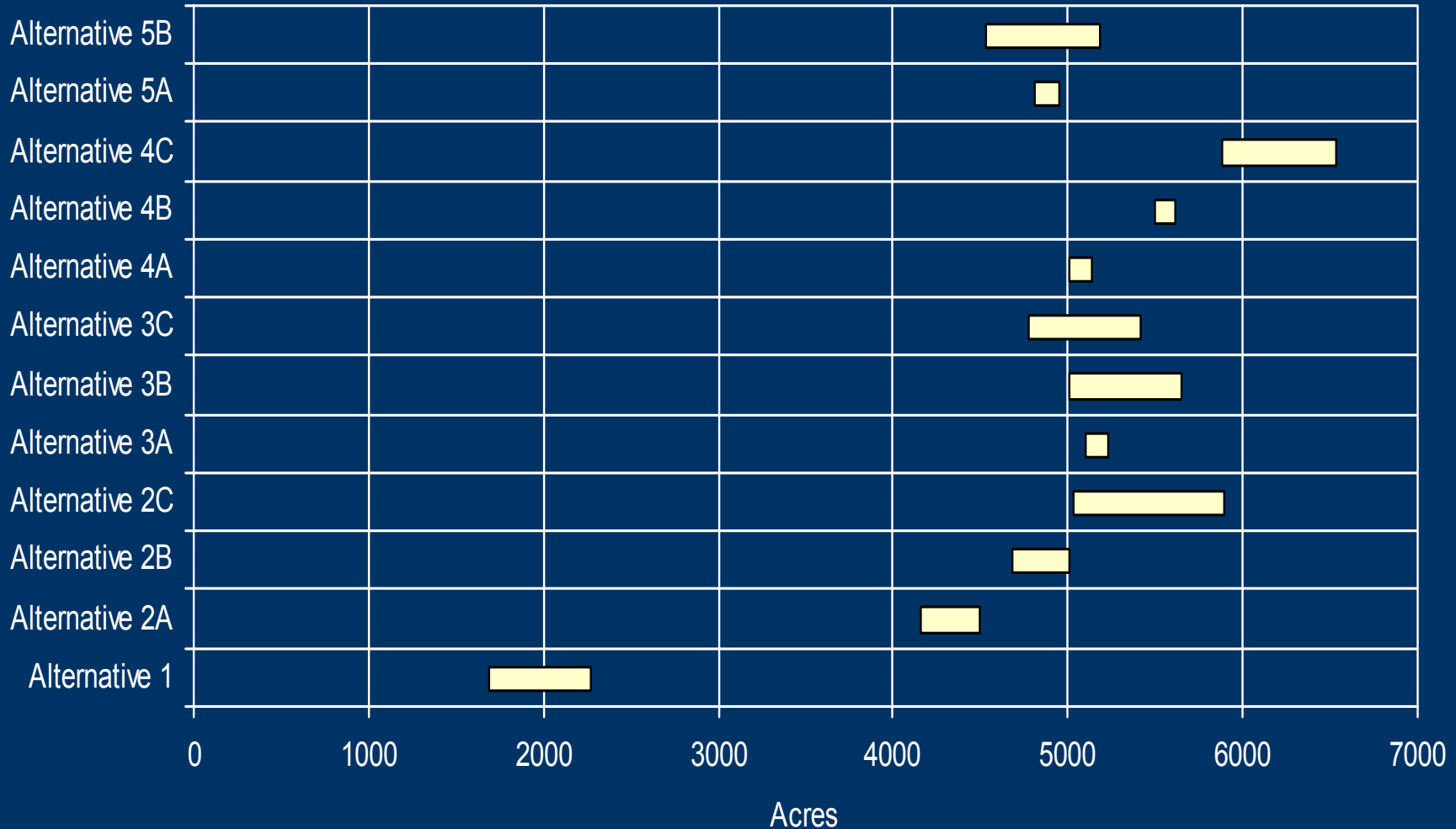
	Employees-Per-Acre
Durable Manufacturing	18.5
Non-Durable Manufacturing	18.5
Mining	8.2
Construction	8.2
Transport., Comm. & Public Util.	8.2
Finance, Insurance & Real Estate	55.8
Retail Trade	8.7
Wholesale Trade	14.7
Services	55.8
Agriculture, Forestry & Fisheries	8.2

# GIS



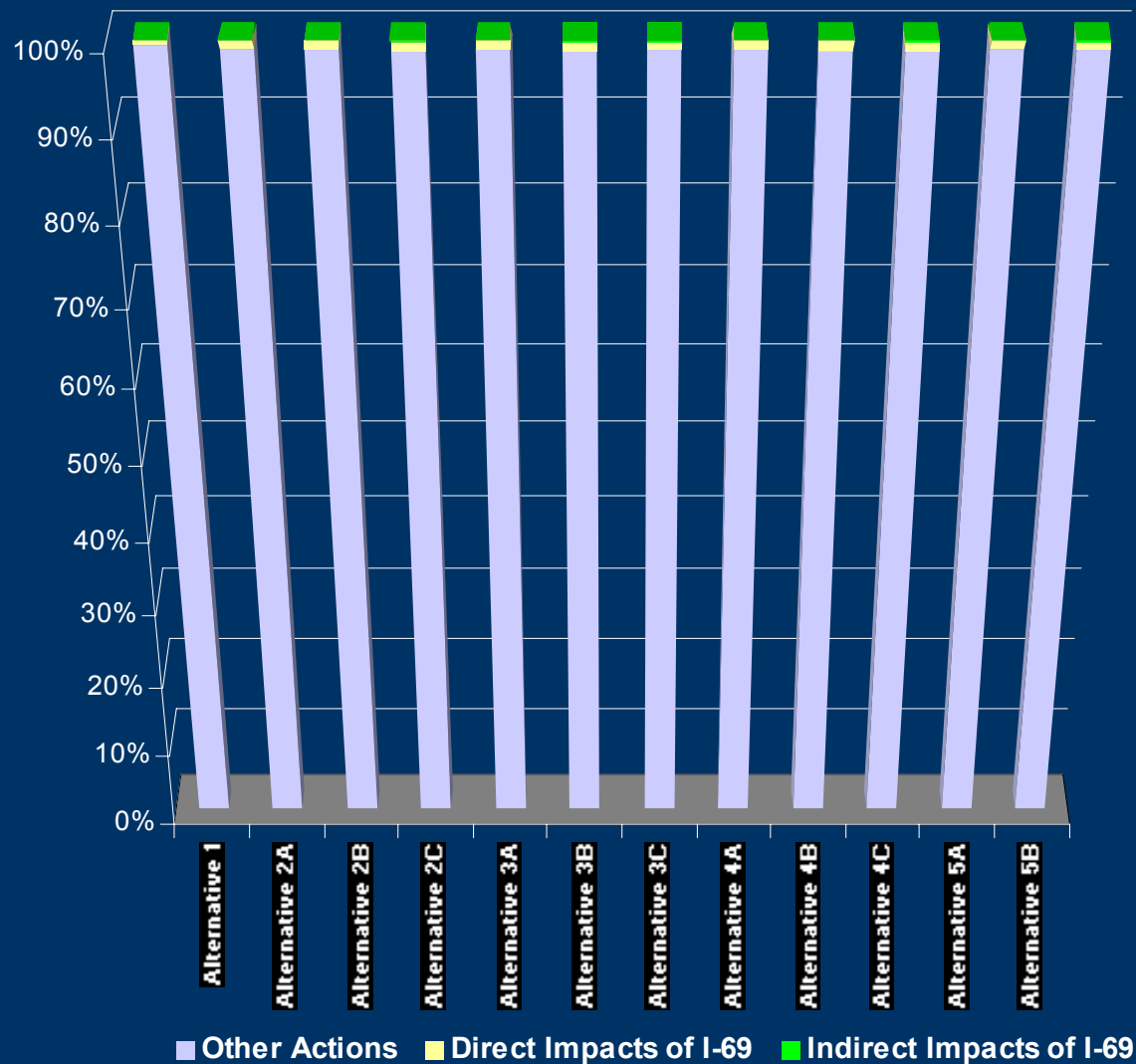
# Process

## Direct and Indirect Farmland Loss Impacts for I-69



# Process

## Cumulative Impacts of I-69 upon Farmland



# Cumulative Impacts

■ Direct Impacts	4,070 – 4,630 acres
■ Indirect Impacts	710 – 790 acres
■ Total Acres in SW Indiana	3,000,000 acres
■ Other Conversions (2000-2025)	477,600 acres



## **FARMLAND**

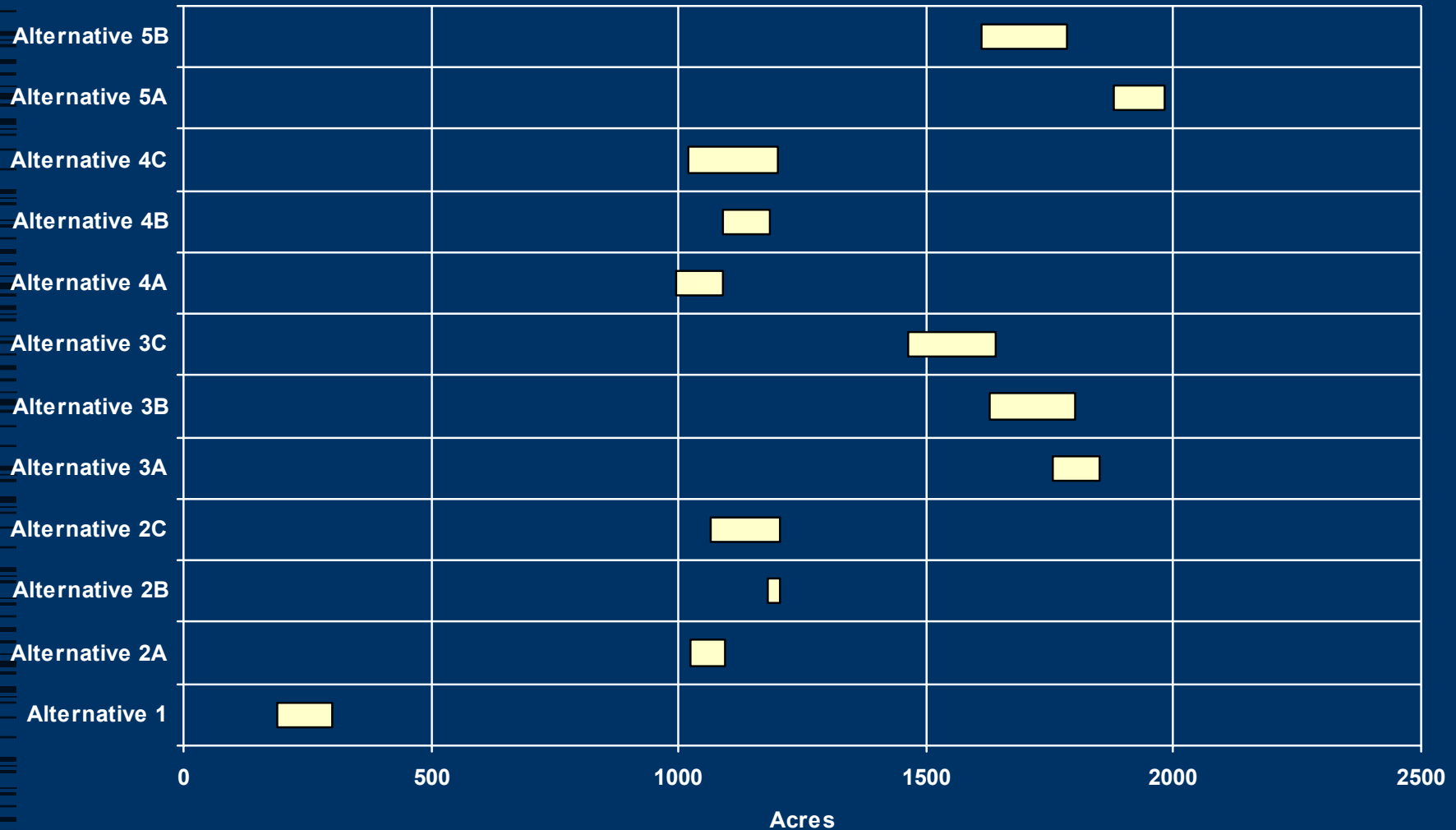
**I-69 Direct Plus Indirect  
Impacts:**

**0.2% of total farmlands**

**1.1% of Cumulative Losses**

# Process

## Direct and Indirect Forest Loss Impacts for I-69



# Cumulative Impacts

■ Direct Impacts	1,140 – 1,275 acres
■ Indirect Impacts	325 – 400 acres
■ Total Acres in SW Indiana	2,025,000 acres



## **FOREST**

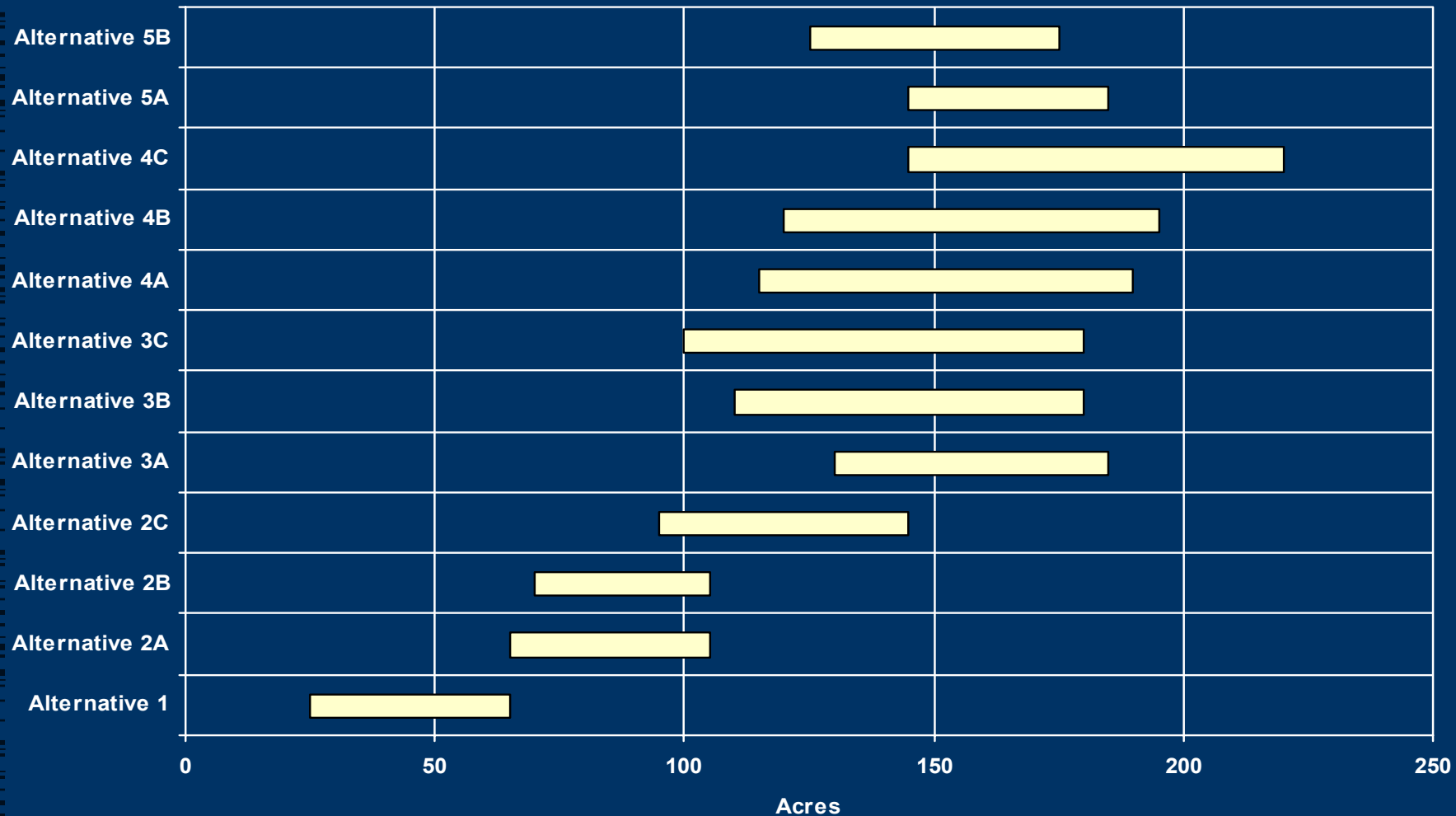
**I-69 Direct Plus Indirect  
Impacts:**

**0.08% of total forests**

**Slight expected cumulative  
gains from other sources**

# Process

## Direct and Indirect Wetland Loss Impacts for I-69



# Cumulative Impacts

- Direct Impacts 90 - 150 acres
- Indirect Impacts 10 - 30 acres
- Total Acreage in SW Indiana 246,000 acres



## **WETLANDS**

**I-69 Direct Plus Indirect  
Impacts:**

**0.07% of total wetlands**

**Negligible cumulative losses  
from other sources**

# Process

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative impacts.



**BEANBLOSSOM BOTTOMS**

# Process

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative impacts.



**FOREST**

# Process

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative impacts.



**FARMLAND**

# Process

11. Monitor the cumulative effects of the alternatives and provide documentation





# Things to Remember

- ◆ FHWA only mitigates direct impacts, must disclose indirect and cumulative impacts
- ◆ Develop close coordination with resource agencies
- ◆ Use a reliable method for determining Indirect Impacts
- ◆ Documentation



# I-69 Website

- ◆ To visit the I-69 website go to the following address:

<http://www.i69indyevn.org>



Thank You!